ATTACHMENT 1

SCOPE OF WORK FOR INTERIM MEASURES IMPLEMENTATION

PURPOSE

Interim measures are actions to control and/or eliminate releases of hazardous waste and/or hazardous constituents from a facility prior to the implementation of a final corrective measure. Interim measures must be used whenever possible to achieve the goal of stabilization which is to control or abate threats to human health and/or the environment, and to prevent or minimize the spread of contaminants while long-term corrective action alternatives are being evaluated.

SCOPE

The documents required for Interim Measures (IM) are, unless the Department of Toxic Substances Control (DTSC) specifies otherwise, an IM Workplan, an Operation and Maintenance Plan and IM Plans and Specifications. The scope of work (SOW) for each document is specified below. The SOWs are intended to be flexible documents capable of addressing both simple and complex site situations. If the Respondent can justify to the satisfaction of DTSC that a plan or portions thereof are not needed in the given site specific situation, then DTSC may waive that requirement.

The scope and substance of interim measures should be focused to fit the site specific situation and be balanced against the need to take quick action.

DTSC may require the Respondent to conduct additional studies beyond what is discussed in the SOWs in order to support the IM program. The Respondent will furnish all personnel, materials and services necessary to conduct the additional tasks.

A. Interim Measures Workplan

The Respondent shall prepare an IM Workplan that evaluates interim measure options and clearly describes the proposed interim measure, the key components or elements that are needed, describes the designer's vision of the interim measure in the form of conceptual drawings and schematics, and includes procedures and schedules for implementing the interim measure(s). The IM Workplan must be approved by the DTSC prior to implementation. The IM Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

Describe the purpose of the document and provide a summary of the project.

2. Conceptual Model of Contaminant Migration

The Respondent must present a conceptual model of the site and contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters (e.g., water solubility, density, Henry's Law Constant, etc.) for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to ground water, etc.). Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found. This analysis may have already been done as part of earlier work (e.g., Current Conditions Report). If this is the case, then provide a summary of the conceptual model with a reference to the earlier document.

3. Evaluation of Interim Measure Alternatives

List, describe and evaluate interim measure alternatives that have the potential to stabilize the facility. Propose interim measures for implementation and provide rationale for the selection. Document the reasons for excluding any interim measure alternatives.

4. Description of Interim Measures

Qualitatively describe what the proposed interim measure is supposed to do and how it will function at the facility.

5. Data Sufficiency

Review existing data needed to support the design effort and establish whether there are sufficient accurate data available for this purpose. The Respondent must summarize the assessment findings and specify any additional data needed to complete the interim measure design. DTSC may require or the Respondent may propose that sampling and analysis plans and/or treatability study workplans be developed to obtain the additional data. Submittal times for any new sampling and analysis plans and/or treatability study workplans must be included in the project schedule.

6. Project Management

Describe the levels of authority and responsibility (include organization chart), lines of communication and a description of the qualifications of key personnel who will direct the interim measure design and implementation effort (including contractor personnel).

7. Project Schedule

The project schedule must specify all significant steps in the process, when any key documents (e.g., plans and specifications, operation and maintenance plan) are to be submitted to DTSC and when the interim measure is to be implemented.

8. Design Basis

Discuss the process and methods used to design all major components of the interim measure. Discuss the significant assumptions made and possible sources of error. Provide justification for the assumptions.

- Conceptual Process/Schematic Diagrams.
- Site plan showing preliminary plant layout and/or treatment area.
- Tables listing number and type of major components with approximate dimensions.
- Tables giving preliminary mass balances.
- Site safety and security provisions (e.g., fences, fire control, etc.).

9. Waste Management Practices

Describe the wastes generated by the construction of the interim measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

10. Required Permits

List and describe the permits needed to construct the interim measure. Indicate on the project schedule when the permit applications will be submitted to the applicable agencies and an estimate of the permit issuance date.

11. Sampling and Monitoring

Sampling and monitoring activities may be needed for design and during construction of the interim measure. If sampling activities are necessary, the IM Workplan must include a complete sampling and analysis section which specifies at a minimum the following information:

a. Description and purpose of monitoring tasks;

b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
f. Sample collection procedures and equipment;
g. Field quality control procedures:
   - duplicates (10% of all field samples)
   - blanks (field, equipment, etc.)
   - equipment calibration and maintenance
   - equipment decontamination
   - sample containers
   - sample preservation
   - sample holding times (must be specified)
   - sample packaging and shipment
   - sample documentation (field notebooks, sample labeling, etc.);
   - chain of custody;
h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Respondent shall follow all DTSC and USEPA guidance for sampling and analysis. DTSC may request that the sampling and analysis section be a separate document.

12. Appendices including:

- Design Data - Tabulations of significant data used in the design effort;
- Equations - List and describe the source of major equations used in the design process;
- Sample Calculations - Present and explain one example calculation for significant calculations; and
- Laboratory or Field Test Results.

B. Interim Measures Operation and Maintenance Plan

The Respondent shall prepare an Interim Measures Operation and Maintenance (O&M) Plan that includes a strategy and procedures for performing operations, maintenance, and monitoring of the interim measure(s). An Interim Measures Operation and Maintenance Plan shall be submitted to DTSC simultaneously with the Plans and Specifications (section C). The O&M plan shall, at a minimum, include the following elements:

1. Purpose/Approach

   Describe the purpose of the document and provide a summary of the project.

2. Project Management

   Describe the levels of authority and responsibility (include organization chart), lines of communication and a description of the qualifications of key personnel who will operate and maintain the interim measure(s) (including contractor personnel).

3. System Description

   Describe the interim measure and identify significant equipment.

4. Personnel Training

   Describe the training process for O&M personnel. The Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

5. Start-Up Procedures

   Describe system start-up procedures including any operational testing.

6. Operation and Maintenance Procedures

   Describe normal operation and maintenance procedures including:

   a. Description of tasks for operation;
   b. Description of tasks for maintenance;
   c. Description of prescribed treatment or operation condition, and
   d. Schedule showing frequency of each O&M task.

7. Replacement schedule for equipment and installed components.

8. Waste Management Practices

   Describe the wastes generated by operation of the interim measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

9. Sampling and Monitoring

Sampling and monitoring activities may be needed for effective operation and maintenance of the interim measure. If sampling activities are necessary, the O&M plan must include a complete sampling and analysis section which specifies at a minimum the following information:

a. Description and purpose of monitoring tasks;
b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
f. Sample collection procedures and equipment;
g. Field quality control procedures:
   - duplicates (10% of all field samples)
   - blanks (field, equipment, etc.)
   - equipment calibration and maintenance
   - equipment decontamination
   - sample containers
   - sample preservation
   - sample holding times (must be specified)
   - sample packaging and shipment
   - sample documentation (field notebooks, sample labeling, etc.);
   - chain of custody;
h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Respondent shall follow all DTSC and USEPA guidance for sampling and analysis. DTSC may request that the sampling and analysis section be a separate document.

10. O&M Contingency Procedures:

a. Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;

b. Should the interim measure suffer complete failure, specify alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and/or the environment or exceed cleanup standards; and

c. The O&M Plan must specify that, in the event of a major breakdown and/or complete failure of the interim measure (includes emergency situations), the Respondent will orally notify DTSC within 24 hours of the

event and will notify DTSC in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on human health and the environment.

11. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data.

The O&M Plan shall specify that the Respondent collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., performance levels achieved, hours of treatment operation, treated and/or excavated volumes, concentration of contaminants in treated and/or excavated volumes, nature and volume of wastes generated, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data; and

c. Personnel, maintenance and inspection records.

DTSC may require that the Respondent submit additional reports that evaluate the effectiveness of the interim measure in meeting the stabilization goal.

C. Interim Measures Plans and Specifications

(Note - The decision to require the submittal of plans and specifications should be based on the site specific situation. The requirement for plans and specifications should be balanced against the need to quickly implement interim measures at a facility.

The Respondent shall prepare Plans and Specifications for the interim measure that are based on the conceptual design but include additional detail. The Plans and Specifications shall be submitted to DTSC simultaneously with the Operation and Maintenance Plan. The design package must include drawings and specifications needed to construct the interim measure. Depending on the nature of the interim measure, many

different types of drawings and specifications may be needed. Some of the elements that may be required are:

- General Site Plans
- Process Flow Diagrams
- Mechanical Drawings
- Electrical Drawings
- Structural Drawings
- Piping and Instrumentation Diagrams
- Excavation and Earthwork Drawings
- Equipment Lists
- Site Preparation and Field Work Standards
- Preliminary Specifications for Equipment and Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the project specifications to DTSC, the Respondent shall:

a. Proofread the specifications for accuracy and consistency with the conceptual design; and

b. Coordinate and cross-check the specifications and drawings.

ATTACHMENT 2

SCOPE OF WORK FOR HEALTH AND SAFETY PLAN

The Department of Toxic Substances Control (DTSC) requires the Respondent to prepare a Health and Safety Plan (HASP) for any and all corrective action field activities at a site. The HASP must be in conformance with Title 8, California Code of Regulations (T8 CCR) Section 5192 (a)(4), DTSC's policies and guidelines, and the NIOSH/OSHA/USCG/EPA Guidance Manual as well as other appropriate State and Federal Health and Safety Regulations.

The HASP is intended to be a functional stand-alone document. The plan is used to educate and familiarize the on-site workers with the site history, proposed work activities, known or potential health hazards, emergency action plans and the site safety information that is necessary to mitigate the risks from the identified hazards. In utilizing the site HASP, field staff should be able to obtain sufficient information to compile an accurate assessment of the site safety issues associated with every job function.

The HASP, which must be kept on site, must address the safety and health hazards of each phase of site operation and include the requirements and procedures for employee protection. The HASP must be organized with component sections and appendices covering all tasks, operations, and contractors/sub-contractors and must embody, at a minimum, the following essential key elements:

- A brief site history/background information.

- An organizational structure to establish a specific chain of command and to specify the overall responsibilities of supervisors and employees. It must include, at a minimum, the following elements:

    - A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

    - A Site Safety and Health Supervisor who has the responsibility and authority to develop and implement the HASP and verify compliance.

    - A Qualified Person for operations defined as hazardous substance removal work, who will be responsible for scheduling any air sampling, laboratory calibration of sampling equipment, evaluation of soil or other contaminated materials sampling results, and for conducting any equipment testing and evaluating the results of the tests.

    - All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

- The lines of authority, responsibility, and communication.

- A safety and health risk or hazard analysis for each site task and operation found in the workplan.

- Employee training records to assure compliance with T8 CCR 5192.

- Personal protective equipment (PPE) to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in T8 CCR 5192 (g)(5).

- Medical surveillance requirements in accordance with the program in T8 CCR 5192 (f).

- Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

- Site control measures in accordance with the site control program required in T8 CCR 5192 (d).

- Decontamination procedures in accordance with T8 CCR 5192 (k).

- An emergency response plan meeting the requirements of T8 CCR 5192 (l) for safe and effective responses to emergencies, including the necessary PPE and other equipment.

- Confined space entry procedures.

- A spill containment program meeting the requirements of T8 CCR 5192 (j).

ATTACHMENT 3

COMMUNITY PROFILE OUTLINE

The following items should be included in the Community Profile:

SITE DESCRIPTION

- Description of proposed project.
- Map.
- Description of the site/facility location.
- Description of the surrounding land uses and environmental resources (including proximity to residential housing, schools, churches, etc.).
- Visibility of the site to neighbors.
- Demographics of community in which the site is located (e.g., socioeconomic level, ethnic composition, specific language consideration, etc.). [This information may be found in local libraries (e.g., census records).]

LOCAL INTEREST

- Contacts with community members - any inquiries from community members, groups, organizations, etc. (include names, phone numbers, and addresses on the key contact list).
- Community interactions - any current meetings, events, presentations, etc.
- Media coverage - any newspaper, magazine, television, etc., coverage.
- Government contacts - city and county staff, state and local elected officials.

KEY CONTACT LIST

- Names, addresses, and phone numbers of city manager, city/county planning department staff, local elected officials, and other community members with whom previous contact has been made.

PAST PUBLIC INVOLVEMENT ACTIVITIES

- Any ad hoc committees, community meetings, workshops, letters, newsletters, etc., about the site or similar activity.

KEY ISSUES AND CONCERNS

- Any specific concerns/issues raised by the community regarding the site/facility or any activities performed on the site/facility.
- Any anticipated concerns/issues regarding the site/facility.
- Any general environmental concerns/issues in the community.

ATTACHMENT 4

SCOPE OF WORK FOR A PUBLIC PARTICIPATION PLAN

The Public Participation Plan (PPP) must address the public involvement needs for all aspects of corrective action including Interim Measures (IM), RCRA Facility Investigation (RFI), Corrective Measures Study (CMS) and Corrective Measures Implementation (CMI). For additional information, see DTSC's Public Participation Manual and RCRA Public Involvement Manual. The PPP shall include the following elements:

1. Introduction

   Describe the public involvement goals and objectives for corrective action (e.g., provide for citizen input and involvement, provide the community with information updates and respond to inquiries). Specify the minimum requirements mandated by law, regulation and policy.

   The amount of public involvement work must be consistent with the nature and degree of community concerns and with any state or federal requirements. The public involvement program should be flexible and able to respond to changing public concerns as the corrective action process proceeds from the RFI to the CMS and into Corrective Measure Implementation (CMI).

2. Public Participation Background

   Identify and describe any known issues or community concerns related to the facility (historically and currently) and environmental issues in general (i.e., awareness of other sites and facilities nearby, involvement in agency decision making related to these other sites). Indicate if any community or local officials have been interviewed. Acquire and describe demographic information about the potentially impacted community, to include non-English-speaking populations.

3. Techniques to Reach Public Participation Goals

   Many public participation techniques may be used to accomplish the objectives. These techniques include: fact sheets, information community workgroup meetings, community advisory committees, community meetings, information repositories, mailing lists and public service announcements. Include a detailed description of how the local community will be contacted and informed. At a minimum, the following items must be developed as described below:

   3.1 Mailing List

Establish and maintain a mailing list of: all local officials; interested, affected and potentially affective private citizens; residents within a one-half mile radius of the facility; contiguous property owners and occupants, (expanded to include owners and occupants of property on off-site plume, if applicable; and news media representatives who should receive fact sheets or other information regarding the investigation/migration activities at the facility. The mailing list must be expanded as time goes on to include all interested persons. The mailing list should be submitted to the Department separately from the PPP. The mailing list shall also include DTSC "mandatory" mailing lists.

3.2 Information Repository

Establish and maintain at least one information repository at a location convenient to public access (e.g., local library). The purpose of the information repository is to allow open and convenient public access to site-related documents approved by the Department for public disclosure. Therefore all documents for the information repository must be approved by the Department. At a minimum, the repository for a site must include copies of the following:

- Order or Consent Agreement
- Regional Water Quality Control Board Orders
- RFI Workplans
- RFI Reports
- Interim Measure Workplans
- Corrective Measures Study Workplans
- Corrective Measures Study Reports
- Public Involvement Plan
- Statement of Basis for Remedy Selection

Other information:

- Copy of relevant laws, regulations and policies;
- Copies of press releases and newspaper clippings that refer to the site;
- Brochures, fact sheets, and other information about relevant laws, regulations, policies and the specific site;
- Any other relevant material (e.g., published studies on the potential risks associated with specific chemicals that have been found at the site)

3.3 Fact Sheet

The Respondent shall prepare fact sheets to inform the community key event in the corrective action process (e.g., interim measures, RFI, RFI

findings, etc.), as indicated in the PPP or directed by DTSC in response to changing site conditions.

It is important that all fact sheets be written clearly so that the public will understand the information. In general, facility fact sheets should include: a description of the overall investigation/remedial process from start to finish; a summary of existing contamination at the facility; a summary of possible impacts on the local community (e.g., drinking water supplies, etc.); a summary of any interim measures being taken or planned at the facility; a synopsis of upcoming activities; and a description of public participation opportunities to include a brief description about the potential uses of available documents in and the location of the information repository. All fact sheets must be approved by DTSC before distribution.

4. Submittal Schedule

The submittal schedule must tie technical milestones (when key documents are to be submitted to DTSC) to public involvement activities.

ATTACHMENT 5

SCOPE OF WORK FOR A RCRA FACILITY INVESTIGATION (RFI)

PURPOSE

The purpose of this RCRA Facility Investigation is to determine the nature and extent of releases of hazardous waste or constituents from regulated units, solid waste management units, and other source areas at the Facility and to gather all necessary data to support the Corrective Measures Study. The RFI must include characterization of the facility (processes, waste management, etc.), environmental setting, source areas, nature and extent of contamination, migration pathways (transport mechanisms) and all potential receptors.

SCOPE

The documents required for an RFI are: a Current Conditions Report, a RCRA Facility Investigation Workplan, a RCRA Facility Investigation Report, a Health and Safety Plan. The scope of work (SOW) for each document is specified below.

A. Current Conditions Report

The Current Conditions Report must describe existing information pertinent to the facility including operations, processes, waste management, geology, hydrogeology, contamination, migration pathways, potential receptor populations and interim corrective measures. The required format for a current conditions report is described below.

1. Introduction

1.1 Purpose

Describe the purpose of the current conditions report.

1.2 Organization of Report

Describe how the report is organized.

2. Facility Description

Summarize background, current operations, waste management and products produced at the facility. Include a map that shows the general geographic location of the facility.

Describe current facility structures including any buildings, tanks, sumps, wells, waste management areas, landfills, ponds, process areas and storage areas.

Include detailed facility maps that clearly show current property lines, the owners of all adjacent property, surrounding land use (residential, commercial, agricultural, recreational, etc.), all tanks, buildings, process areas, utilities, paved areas, basements, rights-of-way, waste management areas, ponds, landfills, piles, underground tanks, wells and other facility features.

3. Facility History

3.1 Ownership History

Describe the ownership history of the facility.

3.2 Operational History

Describe in detail how facility operations, processes and products have changed over time (historical aerial photographs could be useful for this purpose).

3.3 Regulatory History

Describe all permits requested or received, any enforcement actions taken by regulatory agencies and any closure activities that are planned or underway.

3.4 Waste Generation

Describe all wastes (solid or hazardous) that have been generated at the facility. Include approximate waste volumes generated and summaries of any waste analysis data. Show how the waste stream (volume and chemical composition) has changed over time.

3.5 Waste Management

Describe in detail all past solid and hazardous waste treatment, storage and disposal activities at the facility. Show how these activities have changed over time and indicate the current status. Make a clear distinction between active waste management units and older out of service waste management units. Identify which waste management units are regulated under RCRA.

Include maps showing: (1) all solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980, (2) all known past solid waste or hazardous waste treatment, storage or disposal areas regardless of whether they were active on November 19, 1980 and (3) all known past or present underground tanks or piping.

3.6 Spill and Discharge History

Provide approximate dates or periods of past product and waste spills, identify the materials spilled and describe any response actions conducted. Include a summary of any sampling data generated as a result of the spill. Include a map showing approximate locations of spill areas at the facility.

3.7 Chronology of Critical Events

Provide a chronological list (including a brief description) of major events, communications, agreements, notices of violation, spills, discharges that occurred throughout the facility's history.

4. Environmental Setting

4.1 Location/Land Use

Discuss facility size, location and adjacent land use. Include a rough demographic profile of the human population who use or have access to the facility and adjacent lands. Provide approximate distance to nearest residential areas, schools, nursing homes, hospitals, parks, playgrounds, etc.

4.2 Local Ecology

Describe any endangered or threatened species near the facility. Include a description of the ecological setting on and adjacent to the facility. Provide approximate distance to nearest environmentally sensitive areas such as marsh lands, wetlands, streams, oceans, forests, etc.

4.3 Topography and Surface Drainage

Describe the regional and site specific topography and surface drainage patterns that exist at the facility. Include a map that shows the topography and surface drainage depicting all waterways, wetlands, floodplains, water features, drainage patterns and surface water containment areas.

4.4 Climate

Discuss mean annual temperatures, temperature extremes, 24-hour rainfall, average annual rainfall, prevailing wind direction, etc.

4.5 Surface Water Hydrology

Describe the facility's proximity (distance) to surface water bodies (e.g. coastal waters, lakes, rivers, creeks, drainage basins, floodplains, vernal

pools, wetlands, etc.).

4.6 Geology

Describe the regional and site specific geology including stratigraphy and structure. Include cross sections to show the subsurface stratigraphy.

4.7 Hydrogeology

Describe the regional and site specific hydrogeologic setting including any information concerning local aquifers, ground water levels, gradients, flow direction, hydraulic conductivity, and velocity. Include potentiometric surface contour maps. Describe the beneficial uses of the ground water (e.g. drinking water supply, agricultural water supply, etc.). Describe temporal variations (seasonal and historical).

4.8 Ground Water Monitoring System

Describe the facility's ground water monitoring system including a table detailing the existing well construction. The table must, at a minimum, identify the following construction details for each well:

- Well ID
- Completion Date
- Drilling Method
- Borehole Diameter (inches)
- Well Casing Diameter and Type
- Measuring Point Elevation (feet MSL)
- Borehole Depth (feet BGS)
- Depth of Well (feet)
- Screened Interval
- Formation Screened
- Slot Size and Type (inches)
- Filter Pack Material
- Filter Pack Thickness
- Type of Filter Pack Seal
- Thickness of Filter Pack Seal
- Pump System (dedicated or non-dedicated)
- Type of Pump
- Approximate Depth to Water (feet BGS)

If some of this information is not available, so indicate on the table with an "NA". {BGS: Below Ground Surface, MSL: Mean Sea Level}

The monitoring well locations must be shown on the facility map (see Section A.2 of this Attachment).

5. Existing Degree and Extent of Contamination

For each medium where the Order or Consent Agreement identifies a release (e.g. soil, ground water, surface water, air, etc.), describe the existing extent of contamination. This description must include all available monitoring data and qualitative information on the locations and levels of contamination at the facility (both onsite and offsite). Include a general assessment of the data quality, a map showing the location of all existing sampling points and potential source areas and contour maps showing any existing ground water plumes at the facility (if ground water release). Highlight potential ongoing release areas that would warrant use of interim corrective measures (see section 8, Interim Corrective Measures).

5.1 Previous Investigations

List and briefly describe all previous investigation that have occurred at the facility, who they were done for (i.e., agency) and agency contacts.

6. Potential Migration Pathways

6.1 Physical Properties of Contaminants

Identify the applicable physical properties for each contaminant that may influence how the contaminant moves in the environment. These properties could include melting point (°C), water solubility (mg/L), vapor pressure (mm Hg), Henry's law constant (atm m^3/mol), density (g/mL), dynamic viscosity (cp), kinematic viscosity (cs), octanol/water partition coefficient (log K_{ow}), soil organic carbon/water coefficient (log k_{oc}) and soil/water partition coefficients. Include a table that summarizes the applicable physical properties for each contaminant.

6.2 Conceptual Model of Contamination Migration

Develop a conceptual model of contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to ground water, etc.).

Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found (e.g., if a ground water contaminant has a low water solubility and a high density, then the contaminant will

likely sink and be found at the bottom of the aquifer, phase: non-aqueous). Include a discussion of potential transformation reactions that could impact the type and number of contaminants (i.e., what additional contaminants could be expected as a result of biotic and abiotic transformation reactions given the existing soil conditions).

7. Potential Impacts of Existing Contamination

Describe the potential impacts on human health and the environment from any existing contamination and/or ongoing activities at the facility. This description must consider the possible impacts on sensitive ecosystems and endangered species as well as on local populations. Potential impacts from any releases to ground water, surface water, soil (including direct contact with contaminated surface soil) and air (including evaporation of volatile organic compounds from contaminated soil) must be discussed.

7.1 Ground Water Releases

Identify all wells (municipal, domestic, agricultural, industrial, etc.) within a 1-mile radius of the facility. Include a summary of available water sampling data for any identified municipal, industrial or domestic supply wells.

Develop a well inventory table that lists the following items for each identified well:

- Well Designation
- State ID
- Reported Owner
- Driller
- Date of Completion
- Original Use of Well
- Current Use of Well
- Drilling Method
- Borehole Diameter (inches)
- Casing Diameter (inches)
- Perforated Interval (feet)
- Gravel Pack Interval (feet)
- Total Well Depth (feet)
- Depth of Water (feet below ground surface)
- Date of Water Level Measurement

If some of this information is not available, so indicate on the table with an "NA". Include a regional map showing the facility, ground water flow direction and the location of all identified wells within a 1-mile radius of the facility.

Identify and describe any potential ground water discharge to surface water bodies. Identify and list all relevant and applicable water standards for the protection of human health and the environment (e.g., maximum contaminant levels, water quality standards, etc.).

7.2 Surface Water Releases

Discuss the facility's potential impact on surface water within a 2-mile radius of the facility. Describe the potential beneficial uses of the surface water (e.g., drinking water supply, recreational, agricultural, industrial, or environmentally sensitive). Identify all water supply intake points and contact areas within a 2-mile radius of the facility. Include a summary of the most recent water sampling data available for each of the identified water supply intake points. Include a description of the biota in surface water bodies on, adjacent to, or which can be potentially affected by the release. Also summarize any available sediment sampling data.

Include a regional map showing the facility, surface water flow direction, beneficial use areas, and the location of any identified water supply intake points or contact areas that are within a 2-mile radius of the facility.

7.3 Sensitive Ecosystem/Habitats

Discuss the facility's potential impact on sensitive ecosystem.

8. Interim Corrective Measures and Stabilization Assessment

Identify all corrective measures that were or are being undertaken at the facility to stabilize contaminant releases. Describe the objective of the corrective measures including how the measure is mitigating a potential threat to human health and the environment. Summarize the design features of the corrective measure. Include a schedule for completing any ongoing or future work.

Identify and describe potential interim corrective measure alternatives that could be implemented immediately to stabilize any ongoing releases and/or prevent further migration of contaminants and control source areas.

9. Data Needs

Assess the amount and quality of existing data concerning the facility and determine what additional information must be collected to meet the objectives of the RFI. This assessment must identify any additional information that may be needed to (1) support development of interim measures for early action and (2) adequately evaluate and compare corrective measures alternatives. The RFI Workplan must detail how this additional information will be collected.

B. RCRA Facility Investigation Workplan

The RCRA Facility Investigation (RFI) Workplan shall define the procedures necessary to:

1. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any ground water contamination in and around the facility;

2. Characterize the geology and hydrogeology in and around the facility;

3. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any soil contamination in and around the facility;

4. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any soil gas contamination in and around the facility;

5. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any surface water contamination (includes surface water sediments) at the facility;

6. Characterize the presence, magnitude, extent (horizontal and vertical), rate of movement and direction of any air releases at the facility;

7. Identify and characterize any potential sources of contamination;

8. Characterize the potential pathways of contaminant migration;

9. Identify any actual or potential receptors;

10. Gather all data to support human and/or ecological risk assessment reflecting multimedia and multipathway evaluations;

11. Gather all necessary data to support interim corrective measures to stabilize ongoing releases and prevent further contaminant migration; and

12. Gather all necessary data to support the Corrective Measures Study.

The RFI Workplan shall describe all aspects of the investigation, including project management, sampling and analysis, well drilling and installation and quality assurance and quality control. If the scope of the investigation is such that more than one phase is necessary, the "Phase 1" RFI Workplan must include a summary description of each phase.

The required format for an RFI Workplan is described below:

1. Introduction

   Briefly introduce the Workplan. Discuss the Order or Consent Agreement

requiring the RFI and how the Workplan is organized.

2. Investigation Objectives

2.1 Project Objectives

Describe the overall objectives and critical elements of the RFI. State the general information needed from the site. The general information should be consistent with the objectives of the RFI and the data needs identified in the Current Conditions Report.

2.2 Data Quality Objectives

Provide data quality objectives that identify what data are needed and the intended use of the data following the U.S. Environmental Protection Agency procedures in *Guidance For The Data Quality Objectives Process, EPA QA/G-4, September 1994* or the most recent edition.

3. Project Management

Describe how the investigation will be managed, including the following information:

- Organization chart showing key personnel, levels of authority and lines of communication;
- Project Schedule; and
- Estimated Project Budget.

Identify the individuals or positions who are responsible for: project management, field activities, laboratory analysis, database management, overall quality assurance, data validation, etc. Include a description of qualifications for personnel performing or directing the RFI, including contractor personnel.

4. Facility Background

Summarize existing contamination, local hydrogeologic setting and any other

areas of concern at the facility. Include a map showing the general geographic location of the facility and a more detailed facility map showing the areas of possible contamination. Provide a reference to the Current Conditions Report and/or other applicable documents as a source of additional information.

5. Field Investigation

5.1 Task Description

Provide a qualitative description of each investigation task.

5.2 Rationale for Sampling

Describe where all samples will be collected (location and depth), types of matrices that will be sampled and the analytical parameters. Explain the rationale for each sampling point, the total number of sampling points, and any statistical approach used to select these points. The conceptual model of contaminant migration developed in the Current Conditions Report should be considered when selecting sampling locations and depths. If some possible sampling points are excluded, explain why. Describe any field screening techniques that will be used to identify samples for laboratory analysis. Include the rationale for use of field screening techniques and criteria for sample selection.

5.2.1 Background Samples

Background samples should be analyzed for the composite set of parameters for each matrix; treat sediments, surface soils and subsurface soils as separate matrices. Background samples are collected, numbered, package, and sealed in the same manner as other samples. For long term and/or especially large projects, it is recommended that 10% of samples collected be from background locations.

5.3 Sample Analysis

List and discuss all analysis proposed for the project. Include a table that summarizes the following information for each analysis to be performed:

- Analytical Parameters
- Analytical Method Reference Number (from EPA SW 846)
- Sample Preparation and/or Extraction Method Reference Number (from SW 846)
- Detection and Practical Quantitation Limits (Data above the detection limit but below the practical quantitation limit must be reported with the estimated concentration.)

Discuss the rationale for selection of the analytical parameters. The rationale must relate to site history and the RFI objectives. The achievable detection limits or quantitation limits stated in the selected methods must be adequate for valid comparisons of analytical results against any action levels or standards. Give an explanation if all samples from the same matrix will not be analyzed for the same parameters.

Provide the name(s) of the laboratory(s) that will be doing the analytical work. Indicate any special certifications or ratings of the laboratory. Describe the steps that will be taken to select and pre-qualify analytical laboratories to be used including any previous audits and/or other criteria. If a define laboratory has not yet been selected, list at least 3 laboratories that are being considered for the analytical work.

5.4 Sample Collection Procedures

Describe how sampling points will be selected in the field, and how these locations will be documented and marked for future reference. If a sampling grid will be used, describe the dimensions and layout planned for the grid.

Outline sequentially or step-by-step the procedure for collecting a sample for each matrix and each different sampling technique. Include a description of sampling equipment (including materials of construction), field measurements, sample preservation, housekeeping/ cleanliness techniques and well purging procedures. The procedure described must ensure that a representative sample is collected, and that sample handling does not result in cross contamination or unnecessary loss of contaminants. Special care in sample handling for volatile organic samples must be addressed.

Described how and when duplicates, blanks, laboratory quality control samples and background samples will be collected.

The RFI must include sufficient maps and tables to fully describe the sampling effort. This shall include, at a minimum, a map showing all proposed sampling locations and tables that contain the following information:

Sample Collection Table

- Sampling Location/Interval
- Analytical Parameters (e.g., volatile organic compounds)
- Analytical Method Number
- Matrix
- Preservation Method
- Holding Times

- Containers (quantity, size, type plus footnotes that discuss source and grade of containers)

Sample Summary Table

- Sample Description/Area (include QC samples)
- Analytical Parameters
- Analytical Method Number
- Preparation or Extraction Method Number
- Matrix
- Number of Sample Sites
- Number of Analyses

5.4.1 Equipment Decontamination

Describe the decontamination procedure for all drilling and sampling equipment (including metal sleeves), and field-parameter testing equipment. Clearly document the decontamination procedures.

5.4.2 Equipment Calibration and Maintenance

Logbooks or pre-formatted calibration worksheets should be maintained for major field instruments, to document servicing, maintenance and instrument modification. The calibration, maintenance and operating procedures for all instruments, equipment and sampling tools must be based upon manufacturer's instructions. List all field equipment to be used, specify the maintenance/calibration frequency for each instrument and the calibration procedures (referenced in text and included in appendices).

5.4.3 Sample Packaging and Shipment

Describe how samples will be packaged and shipped. All applicable Department of Transportation regulations must be followed.

5.4.4 Sample Documentation

Discuss the use of all paperwork including field notebooks, record logs, photographs, sample paperwork, and Chain of Custody forms (include a blank copy in RFI Workplan Appendices) and seals.

Describe how sample containers will be labeled and provide an example label if available. At a minimum, each sample container label should include: project ID, sample location, analytical parameters, date sampled and any preservative added to the sample.

A bound field log book must be maintained by the sampling team to provide a daily record of events.

Field log books shall provide the means of recording all data regarding sample collection. All documentation in field books must be made in permanent ink. If an error is made, corrections must be made by crossing a line through the error and entering the correct information. Changes must be initialed, no entries shall be obliterated or rendered unreadable. Entries in the log book must include, at a minimum, the following for each days sampling:

- Date
- Starting Time
- Meteorological Conditions
- Field Personnel Protection
- Level of Personnel Protection
- Site Identification
- Field Observations/Parameters
- Sample Identification Numbers
- Location and Description of Sampling Points
- Number of Samples Collected
- Time of Sample Collection
- Signature of Person Making the Entry
- Observation of Sample Characteristics
- Photo Log
- Deviations

5.4.5 Disposal of Contaminated Materials

Describe the storage and disposal methods for all contaminated cuttings, well development and purge water, disposable equipment, decontamination water, and any other contaminated materials. The waste material must be disposed of in a manner consistent with local, state and federal regulations.

5.4.5 Standard Operating Procedures

If Standard Operating Procedures (SOPs) are referenced, the relevant procedure must be summarized in the RFI Workplan. The SOP must be specific to the type of tasks proposed and be clearly referenced in the RFI Workplan. The SOP must also be directly applicable, as written, to the RFI Workplan; otherwise, modifications to the SOP must be discussed. Include the full SOP description in the RFI Workplan appendix.

5.5 Well Construction and Aquifer Testing

When new monitoring wells (or piezometer) are proposed, describe the

drilling method, well design and construction details (e.g., depth of well, screen length, slot size filter pack material, etc.) and well development procedures. Describe the rationale for proposed well locations and selection of all well design and construction criteria (i.e., provide rationale for selection of slot size and screen length).

When aquifer testing is proposed, describe the testing procedures, flow rates, which wells are involved, test periods, how water levels will be measured, and any other pertinent information.

6. Quality Assurance and Quality Control

Quality control checks of filed and laboratory sampling and analysis serve two purposes: to document the data quality, and to identify areas of weakness within the measurement process which need correction.

Include a summary table of data quality assurance objectives that, at a minimum, lists:

- Analysis Group (e.g., volatile organic compounds)
- Matrix
- Practical Quantitation Limits (PQL)
- Spike Recovery Control Limits (%R)
- Duplicate Control Limits +/-(RPD)
- QA Sample Frequency
- Data Validation

A reference may note the specific pages from EPA's SW 846 Guidance Document that list the test method objectives for precision and accuracy. If the field and laboratory numerical data quality objectives for precision are the same and presented on a single table, then a statement should be made to this effect and added as a footnote to the table (e.g., "These limits apply to both field and laboratory duplicates"). Include a copy of the analytical laboratory quality assurance/quality control plan in the appendices of the RFI Workplan and provide the equations for calculating precision and accuracy.

6.1 Field Quality Control Samples

6.1.1 Field Duplicates

Duplicate samples for all parameters and matrices must be collected at a frequency of at least 1 sample per week or 10 percent of all field samples, whichever is greater.

Duplicates should be collected from points which are known or suspected to be contaminated. For large projects, duplicates should be spread out over the entire site and collected at regular intervals.

Duplicates must be collected, numbered, packaged, and sealed in the same manner as other samples; duplicate samples are assigned separate sample numbers and submitted blind to the laboratory.

6.1.2 Blank Samples

Blank samples should be analyzed for all parameters to be evaluated. At least one blank sample per day must be done for all water and air sampling. Additionally, field blanks are required for soil sampling if non-dedicated field equipment is being used for sample collection.

Equipment and field bottle blank samples may be required.

6.2 Laboratory Quality Control Samples

A minimum of one field sample per week or 1 per 20 samples (including field blanks and duplicates), whichever is greater, must be designated as the "Lab QC Sample" for the matrix and laboratory duplicate analysis.

Laboratory quality control samples should be selected from sampling points which are suspected to be moderately contaminated. Label the bottles and all copies of the paperwork as "Lab QC Sample"; the laboratory must know that this sample is for their QC analyses. The first laboratory QC sample of the sampling effort should be part of the first or second day's shipment. Subsequent laboratory QC samples should be spread out over the entire sampling effort.

For water matrices, 2-3 times the normal sample volume must be collected for the laboratory QC sample.

6.3 Performance System Audits by Respondent

This section should describe any internal performance and/or system audit which the Respondent will conduct to monitor the capability and performance of the project. The extent of the audit program should reflect the data quality needs and intended data uses.

7. Data Management

Describe how investigation data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data. To document any quality assurance anomalies, QC Summary Forms must be completed by the analytical laboratory and submitted as part of the RFI Report. In addition, provide examples of any other forms or checklists to be used.

Identify and discuss personnel and data management responsibilities, all field,

laboratory and other data to be recorded and maintained, and any statistical methods that may be used to manipulate the data.

C. RCRA Facility Investigation Report

An RFI Report must be prepared that describes the entire site investigation and presents the basic results. The RFI Report must clearly present an evaluation of investigation results.

The RFI Report must also include an evaluation of the completeness of the investigation and indicate if additional work is needed. This work could include additional investigation activities and/or interim corrective measures to stabilize contaminant release areas and limit contaminant migration. If additional work is needed, a Phase 2 RFI Workplan and/or Interim Corrective Measures Workplan must be submitted along with the RFI Report.

At a minimum, the RFI Report must include:

- A summary of investigation results (include tables that summarize analytical results).
- A complete description of the investigation, including all data necessary to understand the project in its entirety including all investigative methods and procedures.
- A discussion of key decision points encountered and resolved during the course of the investigation.
- Graphical displays such as isopleths, potentiometric surface maps, cross-sections, plume contour maps (showing concentration levels, isoconcentration contours), facility maps (showing sample locations, etc.) and regional maps (showing receptor areas, water supply wells, etc.) that describe report results. Highlight important facts such as geologic features that may affect contaminant transport.
- Tables that list all chemistry data for each matrix investigated.
- An analysis of current and existing ground water data to illustrate temporal changes for both water chemistry and piezometric data (use graphics whenever possible).
- A description of potential or known impacts on human and environmental receptors from releases at the facility.
- A discussion of any upset conditions that occurred during any sampling events or laboratory analysis that may influence the results. The discussion must include any problems with the chain of custody

procedures, sample holding times, sample preservation, handling and transport procedures, field equipment calibration and handling, field blank results that show potential sample contamination and any field duplicate results that indicate a potential problem. Summary tables must be provided that show the upset condition and the samples that could be impacted. QC Forms must be completed by the analytical laboratory and submitted as part of the RFI Report.

ATTACHMENT 6

SCOPE OF WORK FOR A CORRECTIVE MEASURES STUDY

PURPOSE

The purpose of the corrective Measures Study (CMS) is to:

1. Develop and evaluate corrective measure alternatives that may be taken at the Facility to address releases of hazardous wastes (including hazardous constituents); and

2. Recommend the corrective measures to be taken at the Facility that are protective of human health and the environment.

SCOPE

A Corrective Measures Study Workplan and Corrective Measures Study Report are required of the CMS. The Scope of Work (SOW) for the Corrective Measures Study Workplan and Report describe what should be included in each document.

A. Corrective Measures Study Workplan

The Corrective Measures Study (CMS) Workplan shall, at a minimum, include the following elements:

1. A brief project summary;

2. A site-specific description of the overall purpose of the Corrective Measure Study;

3. Corrective measure objectives including proposed media cleanup standards and points of compliance, and corresponding justification and supporting rationale;

4. A description of the specific corrective measure technologies and/or corrective measure alternatives which will be studied;

5. A description of the general approach to investigating and evaluating potential corrective measures;

6. A summary description of any proposed pilot, laboratory and/or bench scale studies. Proposed studies must be further detailed in either the CMS Workplan or in separate workplan. Submittal times for separate workplans must be included in the CMS Workplan project schedule;

7. A proposed outline for the CMS Report including a description of how information will be presented;

8. A description of overall project management including overall approach, levels of authority (include organization chart), lines of communication, budget and personnel. Include a description of qualifications for personnel directing or performing the work; and

9. A project schedule that specifies all significant steps in the process and when key documents (e.g., CMS Report) are to submitted.

B. Corrective Measures Study Report

The Corrective Measures Study (CMS) Report shall, at a minimum, include the following elements:

1. Introduction

Describe the purpose and intent of the document.

2. Description of Current Conditions

The Respondent shall include a brief discussion of any new information that has been developed since the RCRA Facility Investigation Report was finalized. This discussion should concentrate on those issues which could significantly affect the evaluation and selection of the corrective measure alternative(s).

3. Corrective Action Objectives

The Respondent shall propose corrective action objectives including applicable media cleanup standards and points of compliance. The Respondents shall justify media cleanup standards.

4. Identification and Screening of Corrective Measure Technologies

a. Identification

List and briefly describe potentially applicable technologies for each affected media that may be used to achieve the corrective action objectives. Include a table that summarizes the available technologies.

The Respondent should consider innovative treatment technologies. Innovative technologies are defined as those technologies for source control other than incineration, solidification/stabilization and pumping with conventional treatment

for contaminated groundwater.

b. Screening

Technologies must be screened to eliminate those that may prove unfeasible to implement given the existing set of waste and site-specific conditions. The screening is accomplished by evaluating technology limitations and using contaminant and site characterization information from the RCRA Facility Investigation to screen out technologies that cannot be fully implemented at the facility. The screening process must focus on eliminating those technologies which ave several limitations for a given set of waste and site-specific conditions.

As with all decisions during the CMS, the screening of technologies must be fully documented. This is especially true if the screening step indicates that only one corrective action technology should proceed to the next step and be evaluated in detail. List the corrective action technologies selected for further evaluation. Also document the reasons for excluding any corrective action technologies. Include a table that summarizes the findings.

5. Corrective Measure Alternative Development

Assemble the technologies that pass the screening step into specific alternatives that have potential to meet the corrective action objectives. List and briefly describe each corrective measure alternative.

6. Evaluation of Corrective Measure Alternatives

All alternatives must meet the corrective action standards before the remedy decision factors are used for further evaluation.

The corrective action standards are as follows:

- Be protective of human and health and the environment;
- Attain media cleanup standards;
- Control the source(s) of releases; and
- Comply with any applicable federal, state, and local standards for management of waste.

The remedy selection decision factors are as follows:

- Short- and Long-term effectiveness;
- Reduction of toxicity, mobility and/or volume;
- Long-term reliability;
- Implementability; and

- Cost.

6.1 Corrective Action Standards

6.1.1 Be Protective of Human Health and the Environment

Describe in detail how each corrective measure alternative is protective of human health and the environment.

6.1.2 Attain Media Cleanup Standards

Describe in detail each corrective measure alternative's ability to meet the proposed media cleanup standards.

6.1.3 Control the Sources of Releases

Describe in detail each corrective measure alternative's ability to control the sources of releases to stop further environmental degradation.

6.1.4 Comply With Any Applicable Standards for Management of Wastes

Discuss how nay specific waste management activities will be conducted in compliance with all applicable federal, state, or local regulations.

6.2 Remedy Selection Decision Factors

6.2.1 Short- and Long-Term Effectiveness

Each corrective measure alternative must be evaluated as to its effectiveness in protecting human health and the environment and meeting the corrective action objectives. Both short- and long-term components of effectiveness must be evaluated; short-term referring to the construction and implementation period, and long-term referring to the period after the remedial action is complete. Estimate approximately how much time it will take to implement each corrective measure alternative, how much time to see initial beneficial results, and how much time to achieve the corrective action objectives.

The evaluation of short-term effectiveness must include possible threats to the safety of nearby communities, workers, and environmentally sensitive areas (e.g., oceans, wetlands) during construction of the corrective measure alternative. Factors to consider are fire, explosion, exposure to hazardous substances and potential threats associated with treatment, excavation, transportation and re-disposal or containment of waste material.

The evaluation of long-term effectiveness must include possible threats to

the safety of nearby communities workers, and environmentally sensitive areas (e.g., oceans, wetlands) during operation of the corrective measure alternative.

6.2.2 Reduction of Toxicity, Mobility and/or Volume

Each corrective measure alternative must be evaluated for its ability to reduce the toxicity, mobility, and/or volume of the contaminated media. Estimate how much the corrective measure alternative will reduce the waste toxicity, volume and/or mobility (compare initial site conditions to post-corrective measure conditions).

6.2.3 Long-Term Reliability

Each corrective measure alternative must be evaluated with regards to its long-term reliability. This evaluation includes consideration of operation and maintenance requirements.

Discuss whether the technology or combination of technologies have been used effectively together under analogous site conditions, whether failure of an one technology in the alternative has an impact on receptors or contaminant migration, and whether the alternative would have the flexibility to deal with uncontrollable changes at the site (e.g., heavy rain storm, earthquakes, etc.)

Operation and maintenance requirements include the frequency and complexity of necessary operation and maintenance. The availability of labor and materials to meet these requirements must also be considered.

Each corrective measure alternative shall be evaluated in terms of the projected useful life of the overall alternative and of its component technologies. Useful life is defined as the length of time the necessary or required level of effectiveness can be maintained.

6.2.4 Implementability of Corrective Measure Alternatives

Each corrective measure alternative must be evaluated using the following criteria:

- Construction and Operation: Corrective measure alternatives must be feasible to implement given the existing set of waste and site-specific conditions.

- Administrative Feasibility: Discuss the administrative activities needed to implement the corrective measure alternative (e.g., permits, public acceptance, rights of way, off-site approvals, etc.)

- Availability of Services and Materials: Discuss the availability of adequate off-site treatment, storage, disposal services, needed technical services and materials, and the availability of prospective technologies for each corrective measure alternative.

6.2.5 Cost

Develop a preliminary cost estimate, include both capital and operation and maintenance costs, for each corrective measure alternative. Include a description of how the costs were estimated and what assumptions were used.

- The preliminary capital cost estimate must consider all key costs including, at a minimum, costs for engineering, mobilization, demobilization, site preparation, construction, materials, labor, equipment purchase and rental, sampling, analysis, waste disposal, permitting and, health and safety measures.

- The preliminary operation and maintenance cost estimate must consider all key costs including, at a minimum, costs for labor, training, sampling, analysis, maintenance materials, utilities, waste disposal, waste treatment, permitting and, health and safety measures.

- Calculate the net present value of preliminary capital and operation and maintenance costs for each corrective measure alternative.

6.3 Respondent Recommendation

Respondent may recommend a preferred corrective measure alternative. Such a recommendation must include a description and supporting rationale.

Based on the CMS Report and other information including public comments, DTSC will establish final cleanup standards, points of compliance and will select a final remedy.

ATTACHMENT 7

SCOPE OF WORK FOR CORRECTIVE MEASURES IMPLEMENTATION

PURPOSE

The purpose of the Corrective Measures Implementation (CMI) program is to design, construct, operate, maintain and monitor the performance of the corrective measure or measures selected by DTSC. Corrective measures are intended to protect human health and/or the environment from hazardous waste releases from the Facility. The Respondent will furnish all personnel, materials and services necessary to implement the corrective measures program.

SCOPE

The documents required for Corrective Measures Implementation are a Conceptual Design, Final Plans and Specification, Operation and Maintenance Plan, Construction Workplan, Construction Completion Report, Health and Safety Plan, Corrective Measure Completion Report and Progress Reports. The scope of work (SOW) for each document is specified below.

A. CMI Workplan

The Respondent shall prepare a CMI Workplan that clearly describes the size, shape, form, and content of the proposed corrective measure, the key components or elements that are needed, describes the designers vision of the corrective measure in the form of conceptual drawings and schematics, and includes procedures and schedules for implementing the corrective measure(s).

The CMI Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

   Describe the purpose of the document and provide a summary description of the project.

2. Corrective Measures Objectives

   Discuss the corrective measure objectives including applicable media cleanup standards.

3. Conceptual Model of Contaminant Migration

The Respondent must present a conceptual model of the site and contaminant migration. The conceptual model consists of a working hypothesis of how the contaminants may move from the release source to the receptor population. The conceptual model is developed by looking at the applicable physical parameters (e.g., water solubility, density, Henry's Law Constant, etc.) for each contaminant and assessing how the contaminant may migrate given the existing site conditions (geologic features, depth to groundwater, etc.). Describe the phase (water, soil, gas, non-aqueous) and location where contaminants are likely to be found. This analysis may have already been done as part of earlier work (e.g., Current Conditions Report). If this is the case, then provide a summary of the conceptual model with a reference to the earlier document.

4. Description of Corrective Measures

Considering the conceptual model of contaminant migration, qualitatively describe what the corrective measure is supposed to do and how it will function at the Facility. Discuss the constructability of the corrective measure and its ability to meet the corrective measure objectives.

5. Data Sufficiency

Review existing data needed to support the design effort and establish whether or not there is sufficient accurate data available for this purpose. The Respondent must summarize the assessment findings and specify any additional data needed to complete the corrective measure design. Sampling and analysis plans and/or treatability study workplans may have to be developed to obtain additional data. Submittal times for any new sampling and analysis plans and/or treatability study workplans must be included in the project schedule.

6. Project Management

Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will direct the corrective measure design and implementation effort (including contractor personnel).

7. Project Schedule

The project schedule must specify all significant steps in the process and when all CMI deliverables (e.g., Operation and Maintenance Plan, Corrective Measure Construction Workplan, etc.) are to be submitted to the Department.

8. Design Criteria

Specify performance requirements for the overall corrective measure and for each major component. The Respondent must select equipment that meets the performance requirements.

9. Design Basis

Discuss the process and methods for designing all major components of the corrective measure. Discuss the significant assumptions made and possible sources of error. Provide justification for the assumptions. Provide the following information:

- Conceptual Process/Schematic Diagrams
- Site plan showing preliminary plant layout and/or treatment area.
- Tables listing number and type of major components with approximate dimensions.
- Tables giving preliminary mass balances.
- Site safety and security provision (e.g., fences, fire control, etc.).

10. Waste Management Practices

Describe the wastes generated by the construction of the corrective measure and how they will be managed. Also discuss drainage and indicate how rainwater runoff will be managed.

11. Required Permits

List and describe the permits needed to construct and operate the corrective measure. Indicate on the project schedule when the permit applications will be submitted to the applicable agencies and an estimate of the permit issuance date.

12. Appendices including:

- Design Data - Tabulations of significant data used in the design effort;
- Equations - List and describe the source of major equations used in the design process;
- Sample Calculations - Present and explain one example calculation for significant or unique design calculations; and
- Laboratory or Field Test Results.

B. Plans and Specifications

Final Plans and Specifications shall be submitted to the Department simultaneously with the final Operation and Maintenance Plan Construction Workplan and a detailed cost estimate of the project. The final design package must consist of the detailed drawings and specification needed to construct the corrective measure. Depending on the nature of the corrective measure, many different types of drawings and specifications may be needed. Some of the elements that may be required are:

- General Site Plans
- Process Flow Diagrams
- Mechanical Drawings
- Electrical Drawings
- Piping and Instrumentation Diagrams
- Structural Drawings
- Excavation and Earthwork Drawings
- Site Preparation and Field Work Standards
- Construction Drawings
- Installation Drawings
- Equipment Lists
- Detailed Specifications for Equipment Material

General correlation between drawings and technical specifications is a basic requirement of any set of working construction plans and specifications. Before submitting the final project specifications to DTSC, the Respondent shall:

a. Proofread the specifications for accuracy and consistency with the preliminary

b. Coordinate and cross-check the specification and drawings.

All designs must be certified by an independent registered professional engineer.

C. Operation and Maintenance Plan

The Respondent shall prepare an Operation and Maintenance (O&M) Plan that includes a strategy and procedures for performing operations, long term maintenance, and monitoring of the corrective measure. A final Operation and Maintenance Plan shall be submitted to the Department simultaneously with the final Plans and Specifications. The O&M plan shall, at a minimum, include the following elements:

1. Introduction/Purpose

   Describe the purpose of the document and provide a summary description of the project.

2. Project Management

   Describe the management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will operate and maintain the corrective measures (including contractor personnel).

3. System Description

   Describe the corrective measure and identify significant equipment.

4. Personnel Training

   Describe the training process for O&M personnel. The Respondent shall prepare, and include in the technical specifications governing treatment systems, contractor requirements for providing: appropriate service visits by experienced personnel to supervise the installation, adjustment, start up and operation of the treatment systems, and training covering appropriate operational procedures once the start-up has been successfully accomplished.

5. Start-Up Procedures

   Describe system start-up procedures including any operational testing.

6. Operation and Maintenance Procedures

   Describe normal operational and maintenance procedures including:

   a. Description of tasks for operation;
   b. Description of tasks for maintenance;
   c. Description of prescribed treatment or operation conditions; and
   d. Schedule showing frequency of each O&M task.

7. Replacement Schedule

   Provide replacement schedule for equipment and installed components.

8. Waste Management Practices

   Describe the wastes generated by operation of the corrective measure and how they will be managed. Also discuss drainage and indicate how

rainwater runoff will be managed.

9. Sampling and Monitoring

Sampling and monitoring activities may be needed for effective operation and maintenance of the corrective measure. If sampling activities are necessary, the O&M plan must include a complete sampling and analysis section which specifies the following information:

a. Description and purpose of monitoring tasks;
b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory QA/QC procedures in appendices);
f. Sample collection procedures and equipment;
g. Field quality control procedures:
   - duplicates (10% of all field samples)
   - blanks (field, equipment, etc.)
   - equipment calibration and maintenance
   - sample containers
   - sample preservation
   - sample holding times (must be specified)
   - sample packaging and shipment
   - sample documentation (field notebooks, sample labeling, etc.);
   - chain of custody;
h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Respondent shall follow all DTSC and EPA guidance for sampling and analysis. DTSC may require that the sampling and analysis section be a separate document.

10. Corrective Measures Completion Criteria

Describe the process and criteria (e.g., groundwater cleanup goal met at all compliance points for 1 year) for determining when corrective measures may cease. Also describe the process and criteria for determining when maintenance and monitoring may cease.

11. O&M Contingency Procedures:

a. Procedures to address system breakdowns and operational problems including a list of redundant and emergency back-up equipment and procedures;

b. Should the corrective measure suffer complete failure, specify alternate procedures to prevent release or threatened releases of hazardous substances, pollutants or contaminants which may endanger public health and/or the environment or exceed cleanup standards;

c. The O&M Plan must specify that, in the event of a major breakdown and/or complete failure of the corrective measure (includes emergency situations), the Respondent will orally notify DTSC within 24 hours of the event and will notify the Department in writing within 72 hours of the event. The written notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on human health and/or the environment; and

d. Procedures to be implemented in the event that the corrective measure is experiencing major operational problems, is not performing to design specifications and/or will not achieve the cleanup goals in the expected time frame.

12. Data Management and Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data.

The O&M Plan shall specify that the Respondent collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., performance levels achieved, hours of treatment operation, treated and/or excavated volumes, concentration of volume of wastes generated, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data

c. Personnel, maintenance and inspection records.

This data and information should be used to prepare Progress Reports and the Corrective Measure Completion Report.

D. Construction Workplan

The Respondent shall prepare a Construction Workplan which documents the overall management strategy, construction quality assurance procedures and schedule for constructing the corrective measure. A final Construction Workplan shall be submitted to the Department simultaneously with the final Plans and Specifications and final Operation and Maintenance Plan. Upon receipt of written approval from the Department, the Respondent shall commence the construction and provisions contained therein. The Construction Workplan must be approved by the Department prior to the start of corrective measure construction. The Construction Workplan must, at a minimum, include the following elements:

1. Introduction/Purpose

   Describe the purpose of the document and provide a summary description of the project.

2. Project Management

   Describe the construction management approach including levels of authority and responsibility (include organization chart), lines of communication and the qualifications of key personnel who will direct the corrective measure construction effort and provide construction quality assurance/quality control (including contract personnel);

3. Project Schedule

   The project schedule must include timing of key elements of the bidding process, timing for initiation and completion of all major corrective measure construction tasks as specified in the Final Plans and Specifications, and specify when the Construction Completion Report is to be submitted to DTSC.

4. Construction Quality Assurance/Quality Control Program

   The purpose of construction quality assurance is to ensure, with a reasonable degree of certainty, that a completed corrective measure will meet or exceed all design criteria, plans and specifications. The Construction Workplan must include a complete construction quality program to be implemented by the Respondent.

5. Waste Management Procedures

   Describe the wastes generated by construction of the corrective measure and how they will be managed.

6. Sampling and Analysis

Sampling and monitoring activities may be needed for construction quality assurance/quality control and/or other construction related purposed. If sampling activities are necessary, the Construction Workplan must include a complete sampling and analysis section which specifies the following information:

a. Description and purpose of monitoring tasks;
b. Data quality objectives;
c. Analytical test methods and detection limits;
d. Name of analytical laboratory;
e. Laboratory quality control (include laboratory QA/QC procedures in appendices)
f. Sample collection procedures and equipment;
g. Field quality control procedures:

- duplicates (10% of all field samples)
- blanks (filed, equipment, etc.)
- equipment calibration and maintenance
- equipment decontamination
- sample containers
- sample preservation
- sample holding times (must be specified)
- sample packaging and shipment
- sample documentation (field notebooks, sample labeling, etc.);
- chain of custody

h. Criteria for data acceptance and rejection; and
i. Schedule of monitoring frequency.

The Respondent shall follow all DTSC and EPA guidance for sampling and analysis. DTSC may require that the sampling and analysis section be a separate document.

7. Construction Contingency Procedures

a. Changes to the design and/or specifications may be needed during construction to address unforeseen problems encountered in the field. Procedures to address such circumstances, including notification of DTSC, must be included in the Construction Workplan;

b. The Construction Workplan must specify that, in the event of a construction emergency (e.g., fire, earthwork failure, etc.), the Respondent will orally notify DTSC within 24 hours of the event and will notify DTSC in writing within 72 hours of the event. The written

notification must, at a minimum, specify what happened, what response action is being taken and/or is planned, and any potential impacts on public health and/or the environment; and

c. Procedures to be implemented if unforeseen events prevent corrective measure construction.

8. Health and Safety

Construction safety procedures should be specified in a separate Health and Safety Plan

9. Data Management Documentation Requirements

Describe how analytical data and results will be evaluated, documented and managed, including development of an analytical database. State the criteria that will be used by the project team to review and determine the quality of data.

The Construction Workplan shall specify that the Respondent collect and maintain the following information:

a. Progress Report Information

- Work Accomplishments (e.g., hours of operation, excavated volumes, nature and volume of wastes generated, area of cap completed, length of trench completed, etc.).

- Record of significant activities (e.g., sampling events, inspections, problems encountered, action taken to rectify problems, etc.).

b. Monitoring and laboratory data;

c. Personnel, maintenance and inspection records.

This data and information should be used to prepare progress reports and the Construction Completion Report.

E. Cost Estimate/Financial Assurance

The Respondent is required to provide financial assurance from construction to operation and maintenance, and through completion of the corrective measure. The Construction Workplan shall contain a cost estimate, specify financial mechanism to be used and when the mechanism will be established. The cost estimate shall include both construction and, operation and maintenance costs. The financial assurance mechanism may include the equivalent to those in

section 66264.143 or 66265.143 of Title 22 California Code of Regulations: trust fund, surety bond, letter of credit, insurance, and financial test, or any other mechanism acceptable to DTSC.

F. Construction Completion Report

The Respondent shall prepare a Construction Completion (CC) Report which documents how the completed project is consistent with the Final Plans and Specifications. A CC Report shall be submitted to the Department when the construction and all operational tests have been completed. The CC Report shall, at a minimum, include the following elements:

1. Purpose;

2. Synopsis of the corrective measure, design criteria, and certification that the corrective measure was constructed in accordance with the Final Plans and Specifications;

3. Explanation and description of any modifications to the Final Plans and Specifications and why these were necessary for the project;

4. Results of any operational testing and/or monitoring, indicating how initial operation of the corrective measure compares to the design criteria;

5. Summary of significant activities that occurred during construction. Include a discussion of problems encountered and how they were addressed;

6. Summary of any inspection findings (include copies of key inspection documents in appendices);

7. As built drawings; and

8. A schedule indicating when any treatment systems will begin full scale operations.

G. Corrective Measure Completion Report

The Respondent shall prepare a Corrective Measure Completion (CMC) Report when the Respondent believes that the corrective measure completion criteria have been satisfied. The purpose of the CMC Report is to fully document how the corrective measure completion criteria have been satisfied and to justify why the corrective measures and/or monitoring may cease. The CMC Report shall, at a minimum, include the following elements:

1. Purpose;

2. Synopsis of the corrective measure;

3. Corrective Measure Completion Criteria;

   Describe the process and criteria for determining when corrective measures, maintenance and monitoring may cease. (Corrective measure completion criteria were given in the final Operation and Maintenance (O&M) Plan);

4. Demonstration that the completion criteria have been met. Include results of testing and/or monitoring, indicating how operation of the corrective measure compares to the completion criteria;

5. Summary of work accomplishments (e.g., performance levels achieved, total hours of treatment operation, total treated and/or excavated volumes, nature and volume of wastes generated, etc.);

6. Summary of significant activities that occurred during operations. Include a discussion of problems encountered and how they were addressed.

7. Summary of inspection findings (include copies of key inspection documents in appendices); and

8. Summary of total operation and maintenance costs.

H. Submittal Summary

The following list provides a summary of when and how key documents should be submitted to DTSC. DTSC may adjust this list to meet site-specific circumstances.

- The submittal schedule for the CMI Workplan is included in an consent agreement, enforcement order, permit or otherwise specified by DTSC.

- The submittal schedule for the documents list below must be specified in the CMI Workplan. The groupings reflect which documents must be submitted together.

  - Draft Plans and Specifications
  - Draft Operation and Maintenance Plan
  - Draft Construction Workplan

  - Final Plans and Specifications
  - Final Operation and Maintenance Plan
  - Final Construction Workplan

- The submittal schedule for the Construction Completion Report must be

specified in the Final Construction Workplan.

- The submittal schedule for the Corrective Measure Completion Report is based on when the Respondent believes the completion criteria have been satisfied.

- The submittal schedule for progress Reports and a Health and Safety Plan shall be specified by the consent agreement, enforcement order or permit.

ATTACHMENT 8

SCOPE OF WORK FOR PROGRESS REPORTS

Progress reports shall, at a minimum, include:

1. All actions taken during the reporting period to achieve compliance with the Order or Consent Agreement;

2. A summary of any findings made during the reporting period;

3. All problems or potential problems encountered ruing the reporting period (also discuss problem solutions);

4. All projected work for the next reporting period as well as anticipated problems and avoidance measures;

5. A discussion of any changes in personnel that occurred during the reporting period;

6. Summaries of all contacts with representatives of the press, local community or public interest groups.

ATTACHMENT 9

HUGHES RESEARCH LABORATORIES, LLC

PROJECT COST ESTIMATE